INFLUENZA (Individual Cases and Outbreaks)
(also see Respiratory Disease Outbreaks)

1. **Agent**: Influenza viruses A, B, and C. Only influenza A and B are of public health concern since they are responsible for epidemics.

2. **Identification:**

   a. **Symptoms**: Acute onset of fever >100°F (38°C), non-productive cough, sore throat, chills, headache, myalgia, and malaise. Can also cause gastrointestinal (GI) symptoms. Duration is 2-4 days in uncomplicated cases, with recovery usually in 5-7 days. Infection with non-human strains of influenza such as avian influenza viruses theoretically may cause other illness, such as conjunctivitis, gastroenteritis or hepatitis.

   b. **Differential Diagnosis**: Other agents that cause febrile respiratory illnesses or community acquired pneumonia including, but not limited to, *Mycoplasma pneumoniae*, adenovirus, respiratory syncytial virus, rhinovirus, parainfluenza viruses, *Legionella* spp., and severe acute respiratory syndrome (SARS) coronavirus.

   c. **Diagnosis**: Clinical syndrome associated with community outbreaks, confirmed by viral isolation, PCR, rapid antigen test, or a DFA/IFA test.

3. **Incubation**: 1-4 days; average 2 days.

4. **Reservoir**: Humans, possibly swine, and migratory birds.

5. **Source**: Largely droplet spread by nasal and pharyngeal secretions, fomites.

6. **Transmission**: Droplet spread by contact with aerosolized droplets from infective persons or contaminated fomites. Possible airborne spread.

7. **Communicability**: People infected with flu shed virus and may be able to infect others from 1 day before getting sick to 5 to 7 days after. This can be longer in some people, especially children and people with weakened immune systems

8. **Specific Treatment**: Supportive care, e.g., rest, antipyretics, fluids, etc. Antiviral medications may reduce the severity and duration of influenza illness if administered within 48 hours of onset. These same medications may be useful for hospitalized patients or those who are immunocompromised or if vaccine does not cover circulating strain.

   Streptococcal and staphylococcal pneumonias are the most common secondary complications and should be treated with appropriate antibiotics.

9. **Immunity**: Permanent for a specific strain.

REPORTING PROCEDURES

1. **Outbreaks reportable:**

   Under Title 17, Section 2500, *California Code of Regulations* all outbreaks are reportable.

   Influenza outbreaks are often initially reported as respiratory outbreaks (unknown) until laboratory testing confirms influenza as the etiology.

   A cluster or outbreak in a congregate-living facility (e.g., jail, juvenile hall, camps, assisted living centers) is defined as three or more cases of influenza occurring within 48 to 72 hours in residents who are in close proximity to each other (i.e., in the same area of the facility).

   A cluster or outbreak in schools and daycare centers (i.e., community-based) is defined as a sudden increase of influenza cases over the normal background rate or 5 cases of influenza in one week in an epidemiologically linked group (such as a sports team, single classroom, after school group).

   Special Situation: One case of confirmed influenza by any testing method in a skilled nursing facility resident is to be considered an outbreak (until proven otherwise) and should prompt enhanced surveillance for other cases.

2. **Single cases reportable**.

   a. Under Title 17, Section 2500, California Code of Regulations, all cases due to "novel" influenza A (for example due to avian or swine influenza) are reportable.

   b. Under Title 17, Section 2500, California Code of Regulations, all influenza associated deaths in those <65 years are reportable. In Los Angeles County, influenza associated deaths at *any* age are reportable. Influenza-associated deaths must have had 1) confirmed influenza by laboratory testing; and 2) a clinical syndrome consistent with influenza or complications of influenza (pneumonia, ARDS, apnea, cardio-pulmonary arrest, myocarditis, Reye syndrome or acute CNS symptoms (e.g., seizures, encephalitis).

      These reporting requirements may change as circumstances change. Staff are encouraged to check the ACDC Influenza website for updated information: http://lapublichealth.org/acd/Flu.htm.

3. **Report Forms: SEE TABLE 1**

   a. Use the following forms for outbreaks at various settings:

      i. **Sub-acute healthcare facility**
      For initial and final reports of influenza outbreaks:

      CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable)

      See **Sample Line List - Respiratory Outbreak Line List for Residents and Staff**.

      ACDC reports these to the State by completing the **ACUTE FEBRILE RESPIRATORY ILLNESS OUTBREAK REPORT FORM (CDPH 9003 3/12)** with attachment of H-1164 form.

      ii. **Non-healthcare facility**
      For initial report of influenza outbreak:
      INITIAL ASSESSMENT OF RESPIRATORY OUTBREAK REPORT AND WORKSHEET

      For final report of an influenza outbreak (if outbreak continues after initial report has been filed):
      ACUTE FEBRILE RESPIRATORY ILLNESS OUTBREAK REPORT FORM (CDPH 9003 3/12)

   b. Use the following form to report single cases of fatal influenza:

      INFLUENZA FATALITY CASE REPORT FORM (acdc-influ)

      INFLUENZA FATALITY CASE SUPPLEMENTAL FORM (acdc-influ supp) (ACDC USE ONLY)

4. **Epidemiologic Data for Outbreaks:**

   a. Establish a case definition (i.e., fever [measured or reported] and either cough, sore throat, or stuffy nose): include pertinent clinical symptoms and laboratory data (if appropriate).

   b. Confirm etiology of outbreak using laboratory data (rapid test, culture, or PCR).

   c. Create line list that could include:
      i. names of cases
      ii. dates of onset
      iii. symptoms
      iv. age
      v. hospitalization status
      vi. results of laboratory tests
      vii. prior immunization history
      viii. travel history, if relevant
      ix. epi links to other cases (room #s, grades in school, etc)
      x. avian or swine exposure, if relevant

   d. Create an epi-curve, by date of onset for all cases of ILI during the outbreak. Only put those that meet the case definition on the epi-curve.

   e. Maintain surveillance for new cases until rate of influenza is down to "normal" or no new cases for 1 week.

   f. Note that at least 2 patients must have tested positive for influenza in an outbreak to call it an "influenza" outbreak. Otherwise call it respiratory outbreak, unknown origin.

CONTROL OF CASE, CONTACTS & CARRIERS

CASE:

Precautions: None. Advise patients to stay away from work, schools, camps, and mass gatherings for at least 24 hours after resolution of fever. Limit exposure to others, especially those at high risk for complications.

Advise patients with ILI who work in health care settings not to return to work until 7 days after symptom onset or 24 hours after resolution of symptoms, whichever is longer.

As of 2010, there are two FDA approved drugs for the prevention and treatment of influenza A and B: **oseltamivir** (Tamiflu®) and **zanamivir** (Relenza®).

Antiviral resistance to oseltamivir and zanamivir among circulating influenza viruses is currently low, but this might change. Also, antiviral resistance can emerge during or after treatment in certain patients (e.g., immunosuppressed).

To follow current recommendations for treatment and prevention of influenza or for additional information about the use of antivirals for treatment and prophylaxis see: http://www.cdc.gov/flu/antivirals/index.htm

CONTACTS: No restrictions.

Prophylaxis with appropriate antiviral medication (Table 1) during outbreaks is advised for high-risk patients who have not been vaccinated or when the vaccine is of questionable efficacy.

CARRIERS: Not applicable.

GENERAL CONTROL RECOMMENDATIONS FOR OUTBREAKS

1. Reinforce good hand hygiene among all (including visitors, staff, and residents/students).
2. Emphasize respiratory etiquette (cover cough and sneezes, dispose of tissues properly).
3. Provide posters and health education about hand hygiene and respiratory etiquette.
4. Discourage sharing water bottles or water fountains.
5. Emphasize importance of early detection of cases and removing them from contact with others.
6. Encourage regular environmental cleaning with EPA registered disinfectant appropriate for influenza viruses.
7. Consider isolation and/or cohorting and/or quarantine for congregate-living facilities.
8. Consider canceling group activities.
9. Consider using influenza vaccine to control situation (consult with ACDC).
10. Consider post-exposure prophylaxis with antiviral medications for high-risk contacts (consult with ACDC).
11. Provide educational materials to facility-including posters, handouts, etc. Go to this website to order influenza and respiratory virus health education: http://publichealth.lacounty.gov/acd/HCPmaterials.htm

Note: The decision on what antiviral to use needs to be made on a case by case basis, depending on the strain of influenza causing the outbreak.

Consider the additional recommendations for congregate-living facilities, especially with high risk patients:

1. Close facility or affected areas to new admissions until 1 week after last case.
2. Suspend group activities until 1 week after last case.
3. If possible, separate staff that cares for sick from staff that cares for well patients.
4. Institute droplet precautions.
5. Refer to California Department of Public Health, *Recommendations for the Prevention and Control of Influenza in California Long-Term Care Facilities*.
6. Strongly consider using antiviral post-exposure prophylaxis or vaccine to control outbreak (consult with ACDC or AMD).

Note: The decision on what antiviral to use needs to be made on a case by case basis, depending on the strain of influenza causing the outbreak.

DIAGNOSTIC PROCEDURES

Clinical and epidemiologic histories are required to aid in laboratory test selection.

1. **Nasopharyngeal (NP) or nasal swab, and nasal wash or aspirate**. NP swabs are preferred because the specimens can be

tested for influenza and a variety of other respiratory pathogens using PCR based technology. All other specimens can only be tested for influenza. Samples should be collected within the first 4 days of illness. Collect at least 5 specimens for any community-based outbreak (3 for health facilities) and select those patients with the most recent onset for specimen collection.

2. Diagnostic tests available for influenza include viral culture, serology, rapid antigen testing, polymerase chain reaction (PCR), and immunofluorescence assays
3. NOTE: culture should not be attempted when avian influenza is suspected. Contact Public Health Laboratory (PHL) or ACDC for instructions.

Container: Viral Culturette. Do NOT use wooden swab.

Laboratory Form: **Reference Examination for Influenza A, B and/or Other Respiratory Viruses** or online request if electronically linked to the PHL.

Examination: Testing algorithm is determined by the PHL.

Material: Nasopharyngeal swab preferred; nasal swab can be used if necessary. See Standardized procedures for Nasopharyngeal Specimen Collection

Storage: Keep refrigerated and upright. Deliver to PHL as soon as possible.

PREVENTION/EDUCATION

1. All persons >6 months are recommended to receive an annual influenza vaccine.

2. Practice good personal hygiene, avoid symptomatic persons during outbreaks, and do not go to work or school when ill with a respiratory disease.

3. Do not give aspirin to children with influenza and other viral illnesses.

4. Postpone elective hospital admissions during epidemic periods, as beds may be needed for the ill.

5. Restrict the movement of staff and visitors with respiratory infections at all healthcare facilities.

ADDITIONAL RESOURCES

Additional information on the control of influenza during outbreaks, especially in healthcare facilities:

CDC. Infection Control Guidance for the Prevention and Control of Influenza in Acute Care Facilities.

CDC. Infection Control in Health Care *Facilities*. California Department of Public Health. *Recommendations for the Prevention and Control of Influenza in California Long-Term Care Facilities*.

Hospital Association of Southern California. *Recommended Management Actions to Prepare Hospitals for Overflow Situations 2006-2007 Winter Season*

CDC. Seasonal Influenza Information for Health Professionals.

CDC. Seasonal Influenza Information for Specific Groups.

LAC. Acute Communicable Disease Control Program.

Seasonal Influenza in Adults and Children—Diagnosis, Treatment, Chemoprophylaxis, and Institutional Outbreak Management: Clinical Practice Guidelines of the Infectious Diseases Society of America. Clinical Infectious Diseases 2009; 48:1003–32.

Excerpt: Antiviral chemoprophylaxis may be considered for unvaccinated adults, including health care workers, and for children aged ≥1 year who are in close contact with persons at high risk of developing influenza complications during periods of influenza activity…Antiviral chemoprophylaxis and other control measures should be initiated in institutions, such as hospitals and long-term care facilities (e.g., nursing homes), when an influenza outbreak is detected or when influenza is strongly suspected but the etiology of the outbreak has yet to be determined.

Control of Influenza Outbreaks in Institutions

Use of antiviral drugs for treatment and chemoprophylaxis of influenza is a key component of influenza outbreak control in institutions. In

addition to antiviral medications, other outbreak-control measures include instituting droplet precautions and establishing cohorts of patients with confirmed or suspected influenza, re-offering influenza vaccinations to unvaccinated staff and patients, restricting staff movement between wards or buildings, and restricting contact between ill staff or visitors and patients. Neuraminidase inhibitors have been successfully used to control outbreaks caused by antiviral susceptible strains when antivirals are combined with other infection control measures.

When confirmed or suspected outbreaks of influenza occur in institutions that house persons at high risk, chemoprophylaxis with a neuraminidase inhibitor medication should be started as early as possible to reduce the spread of the virus. In these situations, having pre-approved orders from physicians or plans to obtain orders for antiviral medications on short notice can substantially expedite administration of antiviral medications.

Specimens should be collected from ill cases to assess antiviral resistance and provide data on the outbreak viruses. Chemoprophylaxis should be administered to all eligible residents, regardless of whether they received influenza vaccinations during the previous fall, and should continue for a minimum of 2 weeks. If surveillance indicates that new cases continue to occur, chemoprophylaxis should be continued until approximately 7-10 days after illness onset in the last patient. Chemoprophylaxis also can be offered to unvaccinated staff members who provide care to persons at high risk. Chemoprophylaxis should be considered for all employees, regardless of their vaccination status, if indications exist that the outbreak is caused by a strain of influenza virus that is not well-matched by the vaccine.

AVIAN INFLUENZA

Avian flu refers to the disease caused by infection with avian (bird) influenza (flu) Type A viruses. These viruses occur naturally among wild aquatic birds worldwide and can infect domestic poultry and other bird and animal species. Avian flu viruses do not normally infect humans. However, sporadic human infections with avian flu viruses, including H5N1, have occurred.

For more information about avian influenza, visit: http://www.cdc.gov/flu/avianflu

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SWINE INFLUENZA

Swine flu refers to the disease caused by infection with swine (pig) influenza (flu) Type A viruses. These viruses occur naturally among domesticated swine. Swine flu viruses do not normally infect humans but secondary human infections may occur from time to time. When it occurs, the strain of influenza is called “variant” to identify that it is not a “normal” human virus. However pigs can be infected with swine, avian, and human viruses at the same time. When this occurs, genes may be swapped between the different types of viruses resulting in the development of a new viral strain that is easily transmitted between humans. This occurred in 2009 with the development of the 2009 pandemic H1N1.

For more information about swine influenza see http://www.cdc.gov/flu/swineflu/

RESPIRATORY DISEASE OUTBREAK FORMS

SUB-ACUTE HEALTHCARE FACILITY	INITIAL REPORT	FINAL REPORT
	CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, fillable) ACDC reports these to the State by completing the CDPH Congregate-Living Setting Outbreak Form with attachment of H-1164 form.	**ACUTE FEBRILE RESPIRATORY ILLNESS OUTBREAK REPORT FORM (CDPH 9003 3/12)**
NON-HEALTHCARE FACILITY	**INITIAL REPORT**	**FINAL REPORT**
○ Congregate-Living (e.g., jail, juvenile hall, camps, assisted living center)	**INITIAL ASSESSMENT OF RESPIRATORY OUTBREAK REPORT AND WORKSHEET**	**ACUTE FEBRILE RESPIRATORY ILLNESS OUTBREAK REPORT FORM (CDPH 9003 3/12)**
○ Community-Based (e.g., school, daycare center)	**INITIAL ASSESSMENT OF RESPIRATORY OUTBREAK REPORT AND WORKSHEET**	**ACUTE FEBRILE RESPIRATORY ILLNESS OUTBREAK REPORT FORM (CDPH 9003 3/12)**